

Inter-rater and Intra-rater Reliability of the Occupational Therapy Diagnosis

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The occupational therapy diagnosis can be assessed in a reliable (reproducible) way, using a registration form based on the International Classification of Impairments, Disabilities, and Handicaps.

Key words: ICIDH • registration form • reliability
• rehabilitation center • psychiatric hospital

Abstract

A registration form based on the International Classification of Impairments, Disabilities, and Handicaps (ICIDH) was developed and its reliability as a registration of occupational therapy (OT) diagnosis was assessed. Fifty patients from a psychiatric hospital and 57 patients from a rehabilitation center participated in this study. Reliability was determined using two

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measures: the percentage of agreement and Cohen's kappa. Findings of this study indicate that the reliability of the assessments of functional deficits of the patients by occupational therapists is satisfactory to very good. In the rehabilitation center all items, and in the psychiatric hospital 88% of the items, had a kappa value higher than .45. This implies that the registration form can be used in survey research.

Occupational therapists aim to improve the abilities of their patients. According to Rogers and Holm (1991), the occupational therapy (OT) process can be divided into two stages: "The first stage involves the sensing and defining of a patient's functional problem and is accomplished through assessment(s). The second stage focuses on the resolution of problems and is accomplished through intervention and reassessment. The first stage ends in a problem statement or a series of problem statements that describe the functional deficits toward which occupational therapy intervention is directed" (p. 1045). This process of obtaining and interpreting data necessary for treatment is referred to as the OT diagnosis.

Occupational therapists have no standardized diagnostic system to describe the functional deficits of their patients. The International Classification of Impairments, Disabilities, and Handicaps (ICIDH; World Health Organization, 1980) is regarded as an excellent starting point for the classification of assessment and observation findings of occupational therapists (Mather, 1993; Mathiowetz, 1993; Townsend, Ryan, & Law, 1990; Wagstaff, 1982). In this classification, the abilities of the patient are described in terms of impairments (consequences of disease at the structure/function level), disabilities (consequences of disease at the level of the person), and handicaps (consequences of disease at the social level). These three categories are each subdivided into a number of subcategories. Impairments and disabilities both consist of nine subcategories, and handicaps consist of seven subcategories (Table 1). For impairments and disabilities, each subcategory consists of several items.

Two well-known models in OT practice are the human occupations model (Reed & Sanderson, 1980) and the model of occupational performance (Department of National Health and Welfare and the Canadian Association of Occupational Therapists, 1983, 1986). They both greatly resemble the ICIDH. In both models, three categories are distinguished. The human occupations model includes the following categories: occupational performance, subdivided into performance areas (motor, sensory, cognitive, intrapersonal, and interpersonal functions), and occupational areas (self-

care, productivity, and leisure activities). The third category includes environment areas (performance in social, physical, and cultural environment). The model of occupational performance includes performance components (spiritual, physical, sociocultural, and mental components), areas of occupational performance (self-care, leisure, and productivity activities), and environment areas (performance in social, cultural, and physical environment).

Impairments, as listed in the ICIDH, resemble the performance areas of the human occupation model; and when combined with performance components, describe the functions of the individual. Disabilities seem to correspond with occupational areas and areas of occupational performance and describe the activities an individual performs, "whereas handicaps correspond to occupational role performance and describe the performance of an individual in the society" (Table 1; and Townsend et al., 1990).

The ICIDH provides an internationally recognized document complementary to the occupational therapist's model for practice (Townsend et al., 1990). However, using the ICIDH in its complete form is time-consuming and impractical (Bangma, 1985; Lankhorst, Hoppener, & van der Kraaij, 1985), and not all items in the ICIDH are relevant to OT practice. Therefore, the relevant items must be selected and, if necessary, modified. Another problem with the ICIDH is the Handicap section, which has been criticized for being poorly developed and ambiguous to score (Colvez & Robine, 1986; Hirs, 1986). Because handicap is an important item within the OT diagnosis, it must be made more appropriate for OT practice.

On the basis of the ICIDH, the adaptation of the ICIDH for paramedics (Heerkens, Brandsma, Lakerveld-Heyl, & Mischner-van Ravensberg, 1991) and the Dutch profile of occupational therapy, derived from the human occupations model (Dutch Association of Occupational Therapy, 1988), a registration form has been developed to assess the functional deficits of patients. This registration form was developed because of the intention to conduct a survey-study on OT practice in The Netherlands. However, before conducting the survey it was important to investigate whether assessments of occupational therapists with this registration form are reliable. The present study was designed to test the inter- and intra-observer reliability of the assessment of diagnostic data based on clinical observations and examinations by occupational therapists.

As a brief introduction to OT in The Netherlands, the field of work of Dutch occupational therapists is summarized: most therapists (85.3%) work in institutional care, such as nursing homes, rehabilitation centers, and psychiatric hospitals. Only a few therapists (6.5%) work in ambulatory care or have a private practice. The remaining

Table 1
**Comparison of the ICDH with the Human Occupations Model
 and the Model of Occupational Performance**

ICDH	Human Occupations Model *	Model of Occupational Performance **
Impairments	Performance areas	Performance components
intellectual	motor	spiritual
other psychological	sensory	physical
language	cognitive	sociocultural
aural	intrapersonal	mental
ocular	interpersonal	
visceral		
skeletal		
disfiguring		
generalized sensory and other		
Disabilities	Occupational areas	Areas of occupational performance
behavior	self-care	self-care
communication	leisure	leisure
personal care	productivity	productivity
locomotor		
body disposition		
dexterity		
situational		
particular skill		
other activity restrictions		
Handicaps	Environment areas	Environment areas
orientation	social	social
physical independence	cultural	cultural
mobility	physical	physical
occupation		
social integration		
economic self-sufficiency		
other		

*Reed and Sanderson, 1980.

**Department of Health and Welfare and the Canadian Association of Occupational Therapists, 1983, 1986.

8.2% work either in education or in other fields of work. Occupational therapists in The Netherlands differ from those in other countries, such as those in the United Kingdom or the Federal Republic of Germany, because the Dutch therapists work almost exclusively in institutions (Koster, Dekker, & Groenewegen, 1991).

Methods

Design

Because 85% of all working occupational therapists are working in institutional care (Chief Inspectorate of Public Health, 1990), it was obvious that the registration form should be tested there and should include both general and mental health care. It was decided to test the form in a psychiatric hospital and in a rehabilitation center. The inter-observer study was conducted in the psychiatric hospital with two therapists who independently examined a series of patients. The intra-observer study was conducted in the rehabilitation center. Because of time and scheduling problems, it was not possible to do an inter-observer study in the rehabilitation center. Instead, patients were examined by one occupational therapist at two different times.

Registration form

A standard registration form was developed to assess the abilities of the patient. In a manual, definitions and examples were given for all items in the registration form. The registration form contained three main categories: impairments, disabilities, and handicaps. Because the emphasis of OT practice is on disabilities and handicaps, impairments were assessed only in a limited way.

For the impairment category, from the nine subcategories of impairments listed in the ICDH, four subcategories were chosen because they were regarded as most relevant: motor, sensory, cognitive, and psychological impairments. Each category consisted of several items, with a total of 20 items (Table 2). The impairments were recorded as present or absent; and, for motor and sensory impairments, the location was recorded as well.

For the disabilities category, the nine disability subcategories listed in the ICDH were all regarded as relevant to OT practice. The nine subcategories were subdivided into several items, with a total of 29 disabilities (Table 3). The severity of the disabilities was recorded on a three-point scale; this scale was derived from a four-point scale by joining the scores "2" and "3" (Van den Berg & Lankhorst, 1990; Jiwa Boerrigter, van Engelen, & Lankhorst, 1990). This modification was made because the therapists indicated that they had difficulty making the distinction between "some help" (score 2) and "a lot of help" (score 3) on the four-point scale.

The last category concerned handicaps. Because the six subcatego-

Table 2
Inter- and Intra-Observer Reliability of Impairments

Impairments	Rehabilitation		Psychiatry	
	intra-observer		inter-observer	
	% of		% of	
	kappa	agreement	kappa	agreement
Motor impairments				
impairment of structure	0.70	89	-	-
impairment of function	0.70	93	0.75	92
amputation	1.00	100	-	-
coordination	0.85	93	0.91	96
other motor impairments	-	-	-	-
Sensory impairments				
sensory awareness	0.88	95	-	-
proprioception	0.69	96	-	-
pain	0.79	89	0.46†	92
other sensory impairments	-	-	-	-
Cognitive impairments				
impairment of intelligence	-	-	0.41†	90
impairment of memory	0.70†	95	0.85†	96
impairment of thinking	*	98	0.88	96
other cognitive impairments	1.00	100	*	100
Intrapersonal impairments				
impairment of consciousness	-	-	*	94
impairment of emotive and volitional functioning	*	98	#	100
impairment of behavior patterns	-	-	0.72	72
impairment of perception	-	-	0.80	92
impairment of attention	0.81†	96	0.65	78
other intrapersonal impairments	-	-	-	-

- impairment confirmed with no patients.

kappa value could not be calculated.

* impairment confirmed in fewer than 10% of the patients.

† impairment confirmed in 10-20% of the patients.

ries in the ICIDH were not well developed, the ICIDH was combined with another classification developed in The Netherlands, the Groningen Social Disabilities Schedule (GSBS-2; Wiersma, de Jong, Ormel, & Kraaijkamp, 1990). Some handicap items were derived from the ICIDH (orientation, mobility) and some from the GSBS-2 (household role, family role), and the others were a combination of both (physical independence, social role, occupational role; Table 4). The handicaps were recorded on a three-point scale, which was derived from the GSBS-2.

Table 3
Inter- and Intra-Observer Reliability of Disabilities

Disabilities	Rehabilitation intra-observer		Psychiatry inter-observer	
	kappa	% of agreement	kappa	% of agreement
Disabilities in personal care				
excretion	0.93	93	-	-
personal hygiene	0.84	93	-	-
dressng	0.86	93	-	-
feeding	0.78	89	-	-
Domestic disabilities				
doing shopping	0.93	91	0.52	78
preparing food	0.84	88	0.39	76
household activities	0.73	88	0.72	86
maintenance environment	0.89	93	0.63	82
Locomotor disabilities				
balance	0.80	91	0.78†	96
transfers	0.68	84	0.57†	90
walking	0.77	88	0.89	96
traversng	0.71	89	0.73	86
transport	0.64	86	0.62	78
Situational disabilities				
endurance	0.66	88	0.63	84
Awareness disabilities				
disability relating to location in time and space	*	98	0.65	82
knowledge acquisition disability	0.94†	98	0.26	60
personal safety disability	0.45	84	0.58	76
Disabilities in relations				
cooperation	*	93	0.27	66
functionng as a member of a group	*	96	0.53	76
other disabilities in relations	*	95	0.50	78
Particular skill disabilities				
cognitive	0.81	91	0.62	86
psychological	0.81	91	0.68	84
Communication disabilities				
talking and understanding speech	0.78	93	0.53	84
reading	0.82†	95	0.51	88
writing	0.81	91	0.75	92
Social disabilities				
playing games	0.59†	89	0.34	70
hobbies	0.66	82	0.45	82
sports	0.69	88	0.55	82
occupation	0.89	93	0.57	88

- disability was not scored.

* disability confirmed in fewer than 10% of the patients.

† disability confirmed in 10-20% of the patients.

Table 4
Inter- and Intra-Observer Reliability of Handicaps

Handicap	Rehabilitation		Psychiatry	
	intra-observer		inter-observer	
	% of kappa agreement		% of kappa agreement	
orientation	-	-	-	-
physical independence	0.76	88	0.59	80
mobility	0.69	82	0.52	70
social role	0.73	86	0.60	80
occupational role	0.69	80	0.69	80
household role	0.60	75	0.65	88
family role	0.45	82	0.68	82

Therapists

Two therapists participated in the inter-observer study (psychiatric hospital), a female therapist aged 28 and a male therapist aged 30. Both received additional training and both had 4 years of working experience. Nine therapists participated in the intra-observer study (rehabilitation center), six female and three male therapists, aged between 27 and 41 years. Most therapists (55%) had had additional training. The average working experience was 4.5 years (minimum 1 year, maximum 13 years).

Procedure

The data collected by the occupational therapists were based on regular clinical observations and examinations. It was stressed that the therapists should not adapt their standard routines because of the study. The therapists received a brief period of training in use of the registration form, together with written information about its use. All participating therapists filled out the form for three patients. When the form for the first patient was filled in, the therapists had a discussion about the items. After filling in the form for three patients, the first author discussed the problems they experienced. The reliability study was done from March to June 1991. All patients referred for occupational therapy could participate in this study.

In the inter-observer study, the patients were observed for 3 weeks after admission. After these 3 weeks, the two therapists completed the registration form independently. It was agreed that the disabilities in personal care would not be assessed, because in

Table 5
Modified Registration Form

Category	Subitems
Impairments	
Motor impairments	impairment of structure, impairment of function, amputation, coordination, other motor impairments
Sensory impairments	sensory awareness, proprioception, pain, other sensory impairments
Cognitive impairments	impairment of memory, impairment of thinking, neuropsychological function deficit, other cognitive impairments
Intrapersonal impairments	impairment of emotive and volitional functioning, impairment of behavior patterns, impairment of perception, impairment of attention, impairment relating to location in time and space
Disabilities	
Basic skills‡	motor skills, cognitive skills, psychological skills, interactional skills
Communication	talking, understanding, reading, writing
Endurance	physical and psychological endurance
Locomotor	transfers, walking, traversing, transport
Personal care	excretion, personal hygiene, dressing, feeding
Domestic§	moderate household activities, heavy household activities, preparing meals, care of dependents, maintenance environment
Specific skills	handling physical environment,* budgeting
Leisure activities	includes sports, hobbies, and playing games†
Relation	making and maintaining contact with other individuals *, functioning within a group†
Handicap	
Physical independence	
Mobility	
Social role	
Occupational role	
Family/household role†	

* new item

† old items are combined

§ category is restructured

‡ new category with old items

this hospital it was the task of the nursing staff to observe problems in this area.

In the intra-observer study, each therapist completed the form twice, the first time at least 1 month after admission, and the second time at least 7 and at most 10 days after the first time. To ensure that the therapists did not refer to or remember their first rating, two agreements were made: First, when the form was filled out it was handed in immediately to the head of the department. Second, it

was agreed that after at least 1 week and at most 2 weeks the form was filled out for the second time. In this way, the possibility that therapists remembered their first rating was minimized.

Analysis

Two measures were obtained to determine the degree of agreement between pairs of observations: percentage of agreement (which we considered satisfactory if the percentage of agreement was more than 80%) and Cohen's kappa (Cohen, 1960). Cohen's kappa corrects for chance agreement. The maximum value of kappa is 1, but this is seldom achieved. Interpretation is assisted by the terminology of Fleiss (1981) (see also Van Triet, Dekker, Kerssens, & Curfs, 1990). Accordingly, a kappa value of more than .75 indicates an excellent degree of agreement; a kappa value between .40 and .75 is fair to good (which we designated as satisfactory); and a kappa value less than .40 indicates a low level of agreement.

Some impairments, disabilities, or handicaps were identified only among a few patients, so that the frequency distribution appeared to be skewed. This skewness may lead to an increased standard error and a fluctuating value of kappa (Fleiss, 1981; Schouten, 1985; Soeken and Prescott, 1986; van Triet et al., 1990). To our knowledge there are no criteria for relating kappa to the skewness of observations. In the absence of such criteria, we adopted the following rules: If an item (impairment, disability, or handicap) was recorded in fewer than 10% (or more than 90%) of the patients, kappa was not determined. If an item was recorded in more than 10% of the patients but less than 20%, (or more than 80% but less than 90%) of the patients, kappa was computed but had to be interpreted carefully. If an item was recorded in more than 20% (or less than 80%) of the patients, kappa was calculated and interpreted.

Results

Patients

In the psychiatric hospital, of all patients referred to occupational therapy during the time of the study, seven patients were excluded: five could not be treated by the occupational therapists owing to the severity of the disorders; and two because they stayed for too short a time. In the rehabilitation center, no patients were excluded.

In the psychiatric hospital, 50 patients (20 men, 30 women) participated in the study. The medical diagnosis of the patients was classified with the Diagnostic and Statistical Manual of Mental Disorders, Third Edition, Revised (American Psychiatric Association, 1987). Most patients referred for OT exhibited mood disorders (58%). The average age of the patients was 48 years ($SD = 18$ years).

In the rehabilitation center, 57 patients (19 men, 38 women) participated in the study. Their medical diagnosis was classified with the International Classification of Diseases, 9th revision, Clinical Modification (World Health Organization, 1980). Most patients referred to OT exhibited diseases of the circulatory system (64%) and/or diseases of musculoskeletal and connective tissue (40%). (The percentage of diagnostic entries is larger than 100% because the patients can be diagnosed on several items). The average age of the patients is 55 years ($SD = 17$ years).

Intra-observer reliability

Kappa values and percentage of agreement are shown in Tables 2, 3, and 4. The percentage of agreement was higher than 80% for all items, except one. This one item (handicap in household role) had a percentage of agreement of 75%.

Thirty-five items (64%) were assessed for more than 20% of the patients. The value of kappa was higher than .75 for 20 items (57%), and between .40 and .75 for the remaining 15 items (43%).

Only five items (11%) were assessed for more than 10% but fewer than 20% of the patients. The value of kappa for three items (60%) was higher than .75, and for two items (40%) between .40 and .75.

Five items (11%) were assessed for fewer than 10% of the patients, and 8 items (14%) were not assessed for any of the patients. Kappa was not computed for these items.

Inter-observer reliability

Kappa values and percentage of agreement are shown in Tables 2, 3, and 4. The percentage of agreement was 80% or more for 31 items (72%), between 70% and 80% for 10 items (23%), and below 70% for 2 items (5%).

Thirty-five items (70%) were assessed for more than 20% of the patients. The value of kappa was higher than .75 for 17% of the items (6 items), and between .40 and .75 for 72% of the items (25 items). There were four items (11%)—preparing food, knowledge acquisi-

tion, cooperation, and playing games—with a kappa value below .40.

Only five items (10%) were assessed for more than 10% but fewer than 20% of the patients. The value of kappa for two items (40%) was .75 or more, and for three items (60%) between .40 and .75.

Two items (4%) were assessed for fewer than 10% of the patients, 8 items (16%) were not assessed for any of the patients, and one item (impairment of emotive and volitional functions) was assessed for all patients. Kappa was not calculated for these items.

Discussion

In this study the reliability of the assessment of the OT diagnosis using a registration form was determined. The intra-observer reliability was tested in a rehabilitation center and the inter-observer reliability in a psychiatric hospital. For almost all items, both the percentage of agreement and the value of kappa were satisfactory to good in the intra- and inter-observer study.

However, the results in the rehabilitation center, the intra-observer study, were better. In the rehabilitation center only one item (handicap in household role) had a percentage of agreement of 75%. In the psychiatric hospital, 12 items (28%), i.e., two impairment, nine disability, and one handicap item, had a percentage of agreement below 80%, and four disability items had a kappa value below .40. Two explanations can be given for the difference between the rehabilitation center and the psychiatric hospital: First, in the intra-observer study one important factor, the therapist, was kept constant. Therefore, the results of an intra-observer study are generally better than the results of an inter-observer study. Thus, differences in percentage of agreement and the kappa value may be due to the difference in design. Second, in the psychiatric hospital there was a difference in the information that the therapists had about the participating patients. This difference in information was caused by the different topics of group therapy, given by the participating therapists. For instance, one therapist was counseling a "domestic group," and therefore had more or different information about the disability "preparing food" than the other therapist. The same explanation accounts for the disabilities in "cooperation" and "playing games." The low agreement on the remaining disability "knowledge acquisition" cannot be explained on these grounds.

The percentage of agreement and kappa value were calculated on a three-point scale for the disability and handicap items. So, the therapists had to agree on the severity of the disability or handicap,

and this might be the reason that some disability and handicap items had a low percentage of agreement and kappa score. In an additional analysis, the reliability was determined based on the presence or absence of the disability and handicap items (a two-point scale). In this analysis, only three items in the inter-rater study and only one item in the intra-rater study had a percentage of agreement lower than 80%, and the kappa value was lower than .40 for two items in the inter-rater study. Thus, using a two-point scale, the reliability of the assessment is even higher.

To improve the registration form, some changes can be made. The modification of the registration form was based on the evaluation with the participating therapists or unsatisfactory kappa values. Although these adaptations were not tested in another reliability study, we want to explain them here, because there were only a few small changes. The modified registration form is shown in Table 5.

In the impairment section, the items "intelligence" and "consciousness" were removed from the form because they did not occur in many patients. The item "disability relating to location in time and place" was added to the intrapersonal impairments because both the therapists and the classification for paramedics (Heerkens et al., 1991) considered it an impairment instead of a disability.

In the disability section several items were combined because of low kappa values and because the therapists indicated that the difference between these items was rather vague. The following items were combined: disability in cooperation was combined with the disability in functioning as a member of a group (for the combined items, the kappa value was .76; the percentage of agreement was 88%); and disability in playing games was combined with hobbies and sports (for the combined items, the kappa value was .61; the percentage of agreement was 88%). The category domestic disabilities was restructured so that the difference between moderate and heavy household activities was clear. A new item (handling physical environment) was added to the registration form, because the therapists regarded this as an omission.

In the handicap section, the handicap in family role and handicap in household role were combined because therapists were having problems in distinguishing between these two categories (for the combined items, the kappa value was .61; the percentage of agreement was 84%).

The overall conclusion that can be drawn from the study is as follows: The reliability of the assessment of the OT diagnosis—based on the ICIDH—is satisfactory to good for almost all items. This implies that the registration form can be used in survey research.

References

- American Psychiatric Association. (1987). *Diagnostic and statistical manual of mental disorders* (3rd ed. rev.). Washington, DC: Author.
- Bangma, D. (1985). *Use of the ICDH in the period 1983-1985*. Working paper, World Health Organization, June 24-28, 1985. Voorburg, The Netherlands: Rehabilitation Department, Dijkzigt Hospital.
- Chief Inspectorate of Public Health. (1990). *Beroepsuitoefening van ergotherapeuten, verslag van een onderzoek*, April 17-21, 1989. [Practice of profession of occupational therapists: research, April 17-21, 1989]. Rijswijk, The Netherlands: Author.
- Cohen, J. (1960). A coefficient for agreement for nominal scales. *Educational and Psychological Measurement*, 20, 37-46.
- Colvez, A., & Robine, J. M. (1986). Problems encountered in using the concepts of impairment, disability and handicap in a health assessment survey of the elderly in Upper Normandy. *International Rehabilitation Medicine*, 8, 18-22.
- Department of National Health and Welfare and the Canadian Association of Occupational Therapists. (1983). *Guidelines for the client-centered practice of occupational therapy*. (H39-33/1983E). Ottawa, Ontario, Canada: Department of National Health and Welfare.
- Department of National Health and Welfare and the Canadian Association of Occupational Therapists. (1986). *Intervention guidelines for the client-centered practice of occupational therapy*. (H39-100/1986E). Ottawa, Ontario, Canada: Department of National Health and Welfare.
- Dutch Association of Occupational Therapy (NVE). (1988). *Het beroepsprofiel [Profile of the profession]*, Administratief Centrum Delft, The Netherlands: Author.
- Fleiss, L. (1981). *Statistical methods for rates and proportions*, 2nd ed. New York: John Wiley.
- Heerkens, Y. F., Brandsma, J. W., Lakerveld-Heyl, K., & Mischner-van Ravensberg, C. D. (1991). *Verslag fase 1: voorstel voor aanpassing van de classificatie stoornissen en de classificatie beperkingen van de ICDH [Proposal for adaptation of the classification of impairments and the classification of disability from the ICDH, National Institute for Research and Postgraduate Education in Physical Therapy (SWSF)]*. Amersfoort, The Netherlands: SWSF.
- Hirs, W. M. (1986). Meeting of principal investigators for testing the classification of impairment, disabilities and handicaps. *Tijdschrift voor Sociale Gezondheidszorg*, 2, 53-54.

- Jiwa Boerrigter, H., van Engelen, H. G. M., & Lankhorst, G. J. (1990). Application of the ICIDH in rehabilitation medicine. *International Disability Studies*, 12, 17-19.
- Koster, M., Dekker, J., & Groenewegen, P. P. (1991). The position and education of some paramedical professions in the United Kingdom, The Netherlands, the Federal Republic of Germany and Belgium (Physiotherapy, Speech Therapy, Occupational Therapy, Orthoptics Chiropody), pp. 118-141. Utrecht, The Netherlands: The Netherlands Institute for Primary Health Care (NIVEL).
- Lankhorst, G. J., Höppener, M. G. W. C., & van der Kraaij, J. E. (1985). Preliminary experiences with WHO's International Classification of Impairment Disabilities and Handicaps. *International Rehabilitation Medicine*, 7, 70-72.
- Mather, J. H. (1993). The problem of functional assessment: political and economic perspectives. *American Journal of Occupational Therapy* 47, 240-246.
- Mathiowetz, V. (1993). Role of physical performance component evaluations in occupational therapy functional assessment. *American Journal of Occupational Therapy* 47, 225-230.
- Reed, K., & Sanderson, S. R. (1980). *Concepts in occupational therapy*. Baltimore: Williams & Wilkins.
- Rogers, J. C., & Holm, M. B. (1991). Occupational therapy diagnostic reasoning: a component of clinical reasoning. *American Journal of Occupational Therapy*, 45, 1045-1053.
- Schouten, H. J. A. (1985). *Statistical measurement of inter-observer agreement [dissertation]*. Utrecht, The Netherlands: Drukkerij Elinkwijk.
- Soeken, K. L., & Prescott, P. A. (1986). Issues in the use of kappa to estimate reliability. *Medical Care*, 24, 733-741.
- Townsend, E., Ryan, B., & Law, M. (1990). Using the World Health Organization's International Classification of Impairments Disabilities and Handicaps in occupational therapy. *Canadian Journal of Occupational Therapy*, 57, 16-25.
- van den Berg, J., & Lankhorst, G. J. (1990). Inter-rater and intra-rater reliability of disability ratings based on the modified D-code of the ICIDH. *International Disability Studies*, 12, 20-21.
- van Triet, E. F., Dekker, J., Kerssens, J. J., & Curfs, E. Chr. (1990). Reliability of the assessment of impairments and disabilities in survey research in the field of physical therapy. *International Disability Studies*, 12, 61-65.

- Wagstaff, S. (1982). The use of the International Classification of Impairments, Disabilities, and Handicaps in rehabilitation. *Physiotherapy*, 68, 233-234.
- Wiersma, D., de Jong, A., Ormel, J., & Kraaijkamp, H. J. M. (1990). *The Groningen Social Disabilities Schedule: Manual for the use of the instrument for assessing disabilities in social functioning, including questionnaires and score sheet*. The Netherlands: Department of Social Psychiatry of the University of Groningen.
- World Health Organization. (1980). *International Classification of Diseases, 9th rev., Clinical Modification*. Volume 2, Diseases Alphabetic Index (2nd ed.). Geneva: Author.
- World Health Organization. (1980). *International Classification of Impairments, Disabilities and Handicaps*. Geneva: Author.